

What is claimed is:

1. A firearm for firing a cartridge, comprising:
  - a magazine having a rearward end and a forward end, the magazine having
  - 5 a receptacle holding one or more cartridges therein;
  - a barrel having a rearward end and a forward end, the barrel having a bore with a center bore axis extending therethrough;
  - a receiver having a cavity extending therethrough in communication with the magazine receptacle and the barrel bore such that the bore axis extends through
  - 10 the cavity, the cavity further having a chamber portion adjacent a rearward end of the barrel bore to hold one of the cartridges in a firing position, the receiver including a weapon operating system having:
    - a slide extending substantially parallel with the bore axis adjacent to the receiver cavity;
    - 15 a recoil transmitting mechanism coupled to the receiver and in contact with the slide, the recoil transmitting mechanism in communication with the cartridge when the cartridge is in the firing position; and
    - a trigger assembly operable to fire a chambered cartridge, wherein the fired cartridge causes the recoil transmitting mechanism to displace the slide rearwardly.
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2. The firearm of claim 1, wherein the recoil transmitting mechanism includes:
  - a breech lever in contact with the cartridge, the breech lever pivotally coupled to the receiver at a first location remote from the contact with the
  - 25 cartridge, the breech lever further including a breech lug engaging the slide when the cartridge is in the firing position; and
  - an accelerator lever in contact with the breech lever and pivotally coupled to the receiver at a second location and in contact with the breech lever, the accelerator lever including an accelerator lug engaging the slide when the cartridge
  - 30 is in the firing position.

3. The firearm of claim 2, wherein the slide includes a breech lever cam path and an accelerator cam path, the breech lug positioned in the breech cam lever path and the accelerator lug positioned in the accelerator cam path.

5 4. The firearm of claim 3, wherein the breech lever includes:  
a lever arm, the breech lug extending from the lever arm into the breech lever cam path;  
a breech pad pivotally coupled to the lever arm, the breech pad having a bearing surface in contact with the cartridge.

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5. The firearm of claim 1, wherein the firearm is a grenade launcher and the cavity of the receiver is in communication with the magazine receptacle through a positive round control system.

15 6. The firearm of claim 5, the positive round control system comprising:

the slide extending substantially parallel with the bore axis adjacent to the receiver cavity, the slide having a recess substantially adjacent a rear end, the slide movable forward and back substantially along the bore axis;

20 a cartridge carrier having a lifter and at least one cartridge locator for securing a cartridge;

a carrier drive pivotally connected to the cartridge carrier by a carrier pin;

25 a drive pawl pivotally connected to the carrier drive, the drive pawl engaging the recess of the slide during at least a portion of forward motion of the slide along the bore axis; and,

wherein the cartridge carrier is pivotally connected to a carrier link by a link pin so that the carrier drive and the cartridge carrier and the carrier link pivot around the link pin as a functional unit as the slide moves forward and the recess of the slide engages the drive pawl, the functional unit aligning the cartridge secured by the cartridge carrier on the bore axis of the grenade launcher.

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7. The firearm of claim 6, wherein the magazine is an onboard magazine positioned behind the cartridge carrier, the receptacle of the onboard magazine storing a plurality of cartridges, each cartridge including a projectile pointing substantially perpendicular to the bore axis.

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8. The firearm of claim 1, wherein the magazine extends rearwardly from the receiver.

9. The firearm of claim 8, wherein the magazine is substantially tubular.

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10. The firearm of claim 8, wherein the magazine retains a column of grenade cartridges, each cartridge having a nose and a tail, the tail defining a cartridge rim, the magazine comprising:

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at least one interior surface defining a bore for retaining the column of cartridges, the interior surface extending along an axis between a front end and a rear end, the column of cartridges being stacked nose to tail substantially along the axis so that the nose of each cartridge points toward the front end;

a magazine follower positioned at the rear end of the magazine for pushing the column of cartridges toward the front end;

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a vernier member having a plurality of cartridge locators, the vernier member riding on a plurality of pins such that the vernier member is movable within the bore from a first position wherein the plurality of cartridge locators are disengaged from the column of cartridges to a second position wherein at least some of the cartridge locators engage the column of cartridges and displace the cartridges so engaged from contacting one another.

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11. The firearm of claim 10, wherein the cartridge locators are disengaged from the column of cartridges when the vernier member is in its fully forward position, and wherein the column of cartridges are sequentially separated

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beginning with the rearmost cartridge when the vernier member is advanced rearward.

12. The firearm of claim 3, further including means for retarding the  
5 rotation of the breech lever away from the bore axis.

13. The firearm of claim 12, wherein the means for retarding includes a dwell in the breech lever cam path.

10 14. The firearm of claim 1, wherein the recoil transmitting mechanism includes:

a single lever in contact with the cartridge, the lever pivotally coupled to the receiver at a first location remote from the contact with the cartridge, the lever further including a drive lug engaging a lever cam path in the slide when the  
15 cartridge is in the firing position.

15 15. The firearm of claim 14, wherein the lever further includes a breech pad pivotally coupled to the lever, the breech pad having a bearing surface in contact with the cartridge.

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16. A firearm for firing a cartridge, comprising:

a magazine having a rearward end and a forward end, the magazine having a receptacle holding one or more cartridges therein;

25 a barrel having a rearward end and a forward end, the barrel having a bore with a center bore axis extending therethrough;

a receiver having a cavity extending therethrough in communication with the magazine receptacle and the barrel bore such that the bore axis extends through the cavity, the cavity further having a chamber portion adjacent a rearward end of the barrel bore to hold one of the cartridges in a firing position, the receiver  
30 including a weapon operating system having:

a slide extending substantially parallel with the bore axis adjacent to the receiver cavity;

5 a breech lever substantially adjacent to the cartridge when the cartridge is in the firing position, the breech lever pivotally connected to the receiver at a first location; and

an accelerator lever in contact with the breech lever and coupled to the slide when the cartridge is in the firing position, the accelerator lever pivotally connected to the receiver at a second location substantially opposite the first location; and

10 a trigger assembly operable to fire the cartridge in the chamber, wherein the fired cartridge causes the breech lever to direct the accelerator lever against the slide to displace the slide rearwardly.

17. The firearm of claim 16, wherein:

15 the breech lever includes a breech lug engaging the slide when the cartridge is in the firing position; and

the accelerator lever includes an accelerator lug engaging the slide when the cartridge is in the firing position.

20 18. The firearm of claim 17, wherein the slide includes a breech lever cam path and an accelerator cam path, the breech lug positioned in the breech lever cam path and the accelerator lug positioned in the accelerator cam path.

19. The firearm of claim 18, wherein the breech lever includes:

25 a lever arm, the breech lug extending from the lever arm into the breech lever cam path; and

a breech pad pivotally coupled to the lever arm, the breech pad having a bearing surface in contact with the cartridge.

30 20. The firearm of claim 19, further including means for retarding the rotation of the breech lever away from the bore axis.

21. The firearm of claim 20, wherein the means for retarding includes a dwell in the breech lever cam path.

5           22. A firearm for firing a cartridge, comprising:  
a barrel having a rearward end and a forward end, the barrel having a bore with a center bore axis extending therethrough;  
a magazine having a rearward end and a forward end, the magazine having a receptacle centered about and holding one or more cartridges therein; and  
10           a receiver coupled to the rearward end of the barrel, the receiver further being coupled to the forward end of the magazine with at least one spring member therebetween.

23. The firearm of claim 22, wherein the receiver further includes a  
15           weapon operating system having:  
a chamber for holding one of the cartridges in a firing position;  
a slide; and  
a recoil transmitting mechanism coupled to the receiver and in  
contact with the slide, the recoil transmitting mechanism in communication  
20           with the cartridge when the cartridge is in the firing position.

24. The firearm of claim 1, wherein the recoil transmitting mechanism includes:  
a single lever in contact with the cartridge, the lever pivotally coupled to  
25           the receiver at a first location remote from the contact with the cartridge, the lever further including a drive lug engaging a lever cam path in the slide when the cartridge is in the firing position.

25. The firearm of claim 14, wherein the lever further includes a breech  
30           pad pivotally coupled to the lever, the breech pad having a bearing surface in contact with the cartridge.

26. A magazine for retaining a column of grenade cartridges, each cartridge having a nose and a tail, the tail defining a cartridge rim, comprising:

5 at least one interior surface defining a bore for retaining the column of cartridges, the interior surface extending along an axis between a front end and a rear end, the column of cartridges being stacked nose to tail substantially along the axis so that the nose of each cartridge points toward the front end;

a magazine follower positioned at the rear end of the magazine for pushing the column of cartridges toward the front end;

10 a vernier member having a plurality of cartridge locators, the vernier member riding on a plurality of pins such that the vernier member is movable within the bore from a first position wherein the plurality of cartridge locators are disengaged from the column of cartridges to a second position wherein at least some of the cartridge locators engage the column of cartridges and displace the  
15 cartridges so engaged from contacting one another.

27. The magazine of claim 26, wherein each cartridge locator of the vernier member corresponds to one of the column of cartridges.

20 28. The magazine of claim 27, wherein each cartridge locator engaging the column of cartridges engages the rim of the corresponding cartridge.

29. The magazine of claim 26, wherein the cartridge locators are disengaged from the column of cartridges when the vernier member is in its fully  
25 forward position, and wherein the column of cartridges are sequentially separated beginning with the rearmost cartridge when the vernier member is advanced rearward.

30 30. The magazine of claim 29, wherein the magazine is a substantially tubular magazine.

31. A positive round control system for a grenade launcher, comprising:  
a slide extending between a forward end and a back end, the slide having a  
recess substantially adjacent the rear end, the slide movable forward and back  
substantially along a bore axis of the grenade launcher;

5 a cartridge carrier having a lifter and at least one cartridge locator for  
securing a cartridge;

a carrier drive pivotally connected to the cartridge carrier by a carrier pin;

a drive pawl pivotally connected to the carrier drive, the drive pawl  
engaging the recess of the slide during at least a portion of forward motion of the  
10 slide along the bore axis; and,

wherein the cartridge carrier is pivotally connected to a carrier link by a  
link pin so that the carrier drive and the cartridge carrier and the carrier link pivot  
around the link pin as a functional unit as the slide moves forward and the recess of  
the slide engages the drive pawl, the functional unit aligning the cartridge secured  
15 by the cartridge carrier on the bore axis of the grenade launcher.

32. The system of claim 31, further including an onboard magazine  
positioned behind the cartridge carrier, the onboard magazine storing a plurality of  
cartridges, each cartridge including a projectile pointing substantially upward.

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33. The system of claim 32, wherein the onboard magazine includes a  
spring loaded cartridge stop.

34. The system of claim 33, wherein the onboard magazine further  
25 includes cartridge controllers for retaining the forwardmost cartridge, and wherein  
the cartridge controllers are cammed out of engagement with the forwardmost  
cartridge by the cartridge carrier.

35. The system of claim 32, wherein the onboard magazine further  
30 includes cartridge controllers for retaining the forwardmost cartridge.



36. The system of claim 35, wherein the cartridge controllers are cammed out of engagement with the forwardmost cartridge by the cartridge carrier.

5 37. The system of claim 31, further including a stationary cam for camming the drive pawl out of engagement with the recess of the slide, thereby releasing the cartridge carrier from further rotation.

38. The system of claim 31, wherein the lifter has a first end and a second end, the lifter having a notch near the second end of the lifter, the notch  
10 sized to engage an extraction rim of the cartridge.

39. The system of claim 38, further including a stationary lifter cam for rotating the lifter to disengage the notch of the lifter from the extraction rim of the cartridge.  
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40. The system of claim 31, wherein the back end of the slide engages a receptacle on the carrier drive as the slide moves back along the bore axis.

41. The system of claim 31, further including an onboard magazine  
20 positioned behind the cartridge carrier, the onboard magazine storing a plurality of cartridges, each cartridge including a projectile pointing substantially upward, wherein the lifter has a first end and a second end, the lifter having a notch sized to engage an extraction rim of the cartridge near the second end of the lifter, and wherein the back end of the slide engages a receptacle on the carrier drive as the  
25 slide moves back along the bore axis.